Before the
Federal Communications Commission
Washington, D.C. 20554

REQUEST FOR COMMENT	)	
OFFICE OF ENGINEERING AND TECHNOLOGY SEEKS COMMENT ON TECHNOLOGICAL ADVISORY COUNCIL SPECTRUM POLICY RECOMMENDATIONS	)	ET Docket No. 17-340

Comments of LS telcom, Inc. and RadioSoft, Inc.

I. INTRODUCTION

1. LS telcom is a worldwide provider of integrated, scalable, and automated system solutions and strategic consulting service for radio spectrum management and radio spectrum monitoring. The system solutions comply with global ITU standards and integrate regional and national coordination agreements. LS telcom is an ITU-R and ITU-D Sector Member, a White Space Database provider certified by the FCC, and actively participates in radio communications programs with prestigious universities and research institutes around the world. Regulatory authorities/commissions, defense organizations, and network operators in more than 100 countries rely on the commanding capabilities provided by its advanced system solutions and its internationally recognized consulting expertise in all aspects of the radio spectrum management and monitoring discipline. The Canadian regulator ISED (Innovation, Science and Economic Development), an FCC peer regulatory authority, has implemented LS telcom's flagship product SPECTRA Enterprise which replaced their legacy system and modernized their spectrum management environment to support the spectrum management lifecycle from spectrum planning and allocation, technical frequency and interference analysis, licensing and billing to national and international coordination, including cross-border coordination with the relevant US government organizations.

2. RadioSoft is a developer of software and databases for Frequency Coordination, Service and Interference calculation and TIA/EIA TSB-88 compliance to the Commission, Frequency Advisory Committees ("FACs"), the Federal Government and the general radio user community for both Land Mobile and Broadcast users. It is also, by contract, the retail frequency coordinator for both Public Safety (for AASHTO) and Business-Industrial (for AAA and MRFAC) applicants. It is an active participant in spectrum policy debates, and has commented on the record for various Dockets. It is both a White Space Database provider and, under Frequency Finder, Inc., a registrar for the 70-80-90 GHz link service.

II. SUMMARY

1. In EN Docket No. 17-340, the Commission seeks comment on the spectrum policy recommendations that the FCC's Technological Advisory Council (TAC) has made to the FCC through its Chairman and in more detail through several whitepapers. The docket outlines the nine spectrum management principles recommended by the TAC.

2. As an objective voice for spectrum regulators, LS telcom has been actively engaged in the ongoing debate of spectrum policy for over twenty years. As evidenced in the study produced for the European Commission in October of 2007, "Study on radio interference regulatory models in the European Community", the policies and approaches to managing interference (similar to those presented in the TAC study) have been an ongoing topic of debate. A review of the 2007 study when taken into context in 2018, shows that while technology generations change, the issues facing regulators regarding the intelligent management of interference in an increasing crowded spectrum picture have remained quite similar. The largest difference in the situations faced by regulators today versus ten years ago is the pace required for proper spectrum management and interference mitigation. In addition to addressing the inherent physics of the interference scenarios, the policies and procedures defined today must also contemplate the increase in pace presented by dynamic spectrum allocation.

III. DISCUSSION

1. The nine principles outlined in the TAC recommendations provide a high level target for the Commission to implement policy related to the parameters, responsibilities, and the mitigation of interference across the radio spectrum. LS telcom agrees with the general focus of these principles. The following detailed comments outline several areas for further investigation and clarification that can better define the Commission's position.

2. Principles 1-3 outline the basic responsibilities of systems to work within defined limits for handling interference within a range of spectrum. As outlined in Principle 3, the FCC should not base rules on exceptional events, however as outlined in Principles 7-9 this does not preclude the commission from assuring the appropriate enforcement capability is in place to arbitrate spectrum issues as the spectrum usage becomes more congested and dynamic. As the market evolves from the traditional static spectrum allocation, the implementation of dynamic spectrum access methods imply a significant increase in complexity for the enforcement department. The management and handling of interference in a dynamic environment can be much more difficult to detect, diagnose, and handle than a static spectrum allocation.

3. As the regulator, the FCC must implement policies to arbitrate spectrum interference issues as the enforcement authority. The policies implemented must also contemplate the support of arbitrating between dynamic spectrum stakeholders whose interference issues may be unique within a sharing mechanism or algorithm defined. As evidenced by the multiple methods of dynamic spectrum implemented as well as those proposed for future deployment having to provide specific allowances for incumbents as well as the ongoing spectrum allocation operations, the interference scenarios faced have a unique time and or licensing component that are inherently more complex than a static allocations. As the dynamic interference scenarios are often complex to diagnose and isolate, reliance on the spectrum users (incumbents and new entrants) to self-police is not sufficient. The Commission must maintain an oversight capability.

4. LS telcom agrees with the TAC recommendation to develop a next generation architecture for radio spectrum interference resolution. The definition and implementation of a holistic approach for interference resolution will prepare the commission for the increased pace of a dynamic spectrum environment. Such an architecture should include multiple levels of sensor technology combined with the requisite spectrum management automation and analytics with the target to automate the process as much as possible. Automation must be a cornerstone requirement of the architecture. As the dynamic nature of spectrum allocation continues to advance from the initial TVWS implementations to CBRS and beyond, the requirements for proper oversight and enforcement of violations in the operation of systems within the spectrum is complex to properly manage as the violations may be short in duration and vary in location.

5. The implementation of the policies should be careful to maintain the technology agnostic approach of the FCC. While market forces will drive innovation as well as the most efficient spectrum

use, the characteristics of a technology can help to define the workable parameters for operations. The commission should consider when possible to look to independent analysis of technology deployments to evaluate the impacts to all stakeholders. The independent analysis can contemplate the impacts of numerous technology implementations and provide objective recommendations to the Commission.

6. LS telcom agrees with the position to expand the analysis of propagation modeling capabilities to better define the spectrum operating environment. The Commission can look to independent analysis for input on the propagation modeling methods and techniques to determine the appropriate method for a given range of spectrum, technology, and service provided.

7. As a clarification to Principle #8, LS telcom recommends that for Interference Limits considered at the Receiver level, the in-band and out-of-band signal levels must be exceeded independent of the Receiver. This should be expressed in values transparent to the receiving Radio Frequency path (e.g. dBuV/m or W/m^2).

IV. CONCLUSION

1. The implementation of the policies must be consistent with the technology agnostic approach of the FCC. While market forces will drive innovation as well as the most efficient spectrum use, the characteristics of a technology can help to define the workable parameters for operations. The Commission should leverage independent analysis of technology deployments to objectively evaluate the impacts to all stakeholders.

2. The definition and implementation of next generation interference mitigation capability is critical to the FCC's ability to maintain the proper enforcement capability and keep pace with the evolution of spectrum usage to a dynamic environment. This implementation should include the automation of requisite spectrum management capabilities and multiple levels of sensor technology as a baseline.

Respectfully submitted this 31st of January, 2018 by

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Casey Joseph,
Vice President
LS telcom Inc.
5021 Howerton Way, Suite E
Bowie, MD 20715
Mob: +1.301.377.6966
CJoseph@LStelcom.com

Richard Womersley
Director, Spectrum Services
LS telcom, AG
Im Gewerbegebiet 31-33
D-77839 Lichtenau, Germany
Mob: +49 (0) 15 222 614 645
RVWomersley@LStelcom.com

Ing. Peter Riemann
President
LS telcom Limited
1145 Hunt Club Road, Suite 100
Ottawa, Ontario, Canada, K1V 0Y3
Tel: +1.613.248.8686 x1007
Fax: +1.613.248.8965
PRiemann@LStelcom.com

Michael Henderson
Director
RadioSoft, Inc.
194 Professional Park Drive
Clarkesville, GA 30523
Tel : +1.888.732.4695
Fax : +1.706.754.2745
MHenderson@RadioSoft.com